



## PLANT BREEDING AND FOOD SECURITY

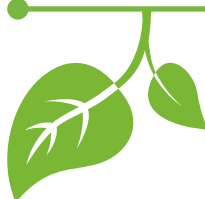
### WHAT IS food security?

What was the first thing you did today? If you live in the developed world, most likely you got out of bed (**yay - you have a bed!**), brushed your teeth and had a drink of water (**a miracle - safe water, delivered right to your sink!**) and went downstairs to decide what to have for breakfast. **You have food security.**

In some parts of the world, your morning would be much different. You might have a warm place to sleep. You might have access to safe drinking water, but you'll have to fetch it. And breakfast (actually lunch and dinner too) is rice. Aw, man - rice again? Too bad; that's all there is.



! According to the United Nations, more than 800 million of the world's 7.5 billion people are undernourished. This is about 216 million less than in 1992, but we've still got a long way to go.



### FEEDING A HUNGRY WORLD.

Plant breeding creates new crop varieties to meet a whole host of challenges, such as producing food with enhanced nutrition, crops that yield more, need less fertilizer or resist pests better. Farmers can efficiently produce high-quality food and make a living while keeping prices more affordable.

### A MOVING TARGET

Plant breeders must constantly develop and improve new varieties because conditions always change. Pests, disease and climate change threaten crops. New, more nutritious crops are needed. A growing population demands we grow 25 to 70 per cent more food on the same amount of land by 2050 - and do it with the least harm possible to ecosystems and wildlands.





### THE GREEN REVOLUTION

In the mid 20th century, countries faced starvation because they couldn't grow enough food or afford to buy it from elsewhere. Plant breeders developed wheat and rice with shorter, thicker stalks with larger seed heads. Varieties were developed for different conditions around the world. Researchers developed synthetic fertilizers and herbicides to control weeds. Food production soared.

A leader of this "Green Revolution" was American plant scientist Norman Borlaug. With proper fertilizers and care, the dwarf varieties he developed for Mexican farmers delivered six times the yield, helping to make that country self-sufficient in wheat.

Borlaug was awarded a Nobel Prize for his work, which is said to have saved the lives of a billion people. Countries that had to import food or go hungry could now grow their own and even have a surplus for export.



WHO WILL BE  
THE NEXT  
NORMAN BORLAUG ?

### SUBMARINE RICE

A popular image of rice is of farmers stooping to plop small plants in the mud of a flooded paddy. But while rice likes wet soil to get started, it will die in just a few days if it gets totally submerged with flooding. Many of the world's farmers grow rice on land prone to flooding, something expected to worsen with climate change. It's a big problem, since rice is our most important food crop, eaten by half the world's people every day.

Working with the International Rice Research Institute, American researcher Pamela Ronald and her colleagues identified a gene – appropriately named SUB-1 – that allowed rice to withstand up to 17 days of flooding. This gene was then bred into varieties nicknamed "scuba rice" that are now widely grown in countries such as India and Bangladesh.



### NOT MUCH VARIETY IN THE PANTRY

It's estimated there are tens of thousands of edible plants in the world. We cultivate about 150 – and about a dozen crops provide three quarters of our food. The big three – rice, corn and wheat – provide more than half the world's food energy. Relying on such a small number of plants leaves us vulnerable to malnutrition, since no single crop can provide all the nutrients needed for good health. It also leaves us open to plant diseases that could wipe out whole crops.

Crops such as quinoa and amaranth are gaining in popularity but have yet to make much of a dent in the **big three**.